Manitoba Agriculture

formation Update

GUIDELINES FOR ESTIMATING
ALFALFA SEED
COST OF PRODUCTION

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This guide is designed to provide planning information and a format for calculating the costs of production in an Alfalfa Seed enterprise using leafcutter bees.

This budget was developed from information provided by a group of four producers on a consensus basis, who have a combined experience of 40 years of alfalfa seed production utilizing leafcutter bees.

When interpreting these costs for an individual situation, adjustments may be required. Each assumption must be examined and adjustments made where necessary.

The production costs reflected in this budget should not be construed as representing average values for the Manitoba industry.

ALFALFA SEED COST OF PRODUCTION (Per Hectare)

		Establishment (1)	Cropping Years (5)	Total Years (6)
A.	**OPERATING COSTS**			
1.01	Seed	$ 23.02	$ 0.00	$ 23.02
1.02	Fertilizer	18.00	0.00	18.00
1.03	Herbicides	49.52	98.57	542.37
1.04	Insecticides	0.00	31.43	157.15
1.05	Machinery Oper.	65.45	40.70	268.95
1.06	Field Inspection	0.00	3.00	15.00
1.07	Roguing	0.00	12.35	61.75
1.08	Pollination Costs	0.00	29.45	147.25
1.09	Miscellaneous	5.00	12.35	66.75
Subtotal Operating Costs		160.99	227.85	1,300.24
1.10	Interest On Oper. (15%)	6.04	8.54	48.76
TOTAL OPERATING COSTS		**$167.03**	**$236.39**	**$1,349.00**
B.	**FIXED COSTS**			
2.01	Land Costs	$ 62.00	$ 62.00	$ 372.00
2.02	Depreciation	33.60	33.60	201.60
2.03	Investment (10%)	28.20	28.20	169.20
2.04	Pollination Fixed Costs	0.00	122.25	611.25
TOTAL FIXED COSTS		**$123.80**	**$246.05**	**$1,354.05**
C.	**LABOUR**			
3.01	Alfalfa	$ 40.00	$ 29.60	$ 188.00
3.02	Leafcutters	0.00	34.58	172.90
TOTAL LABOUR COSTS		**$ 40.00**	**$ 64.18**	**$ 360.90**
TOTAL COST OF PRODUCTION		**$330.83**	**$546.62**	**$3,063.95**
Flax Income				$ 264.00
Bee Income				$ 62.50
NET TOTAL COST				**$2,737.45**
Total Yield				1,515 kg
Breakeven Cost on Total Yield				
	Operating			$0.68/kg
	Total			$1.81/kg

ALFALFA SEED COST OF PRODUCTION (Per Acre)

		Establishment (1)	Cropping Years (5)	Total Years (6)
A.	**OPERATING COSTS**			
1.01	Seed	$ 9.35	$ 0.00	$ 9.35
1.02	Fertilizer	7.30	0.00	7.30
1.03	Herbicides	20.05	39.90	219.55
1.04	Insecticides	0.00	12.60	63.00
1.05	Machinery Oper.	26.50	16.45	108.75
1.06	Field Inspection	0.00	1.21	6.05
1.07	Roguing	0.00	5.00	25.00
1.08	Pollination Costs	0.00	11.90	59.50
1.09	Miscellaneous	2.00	5.00	27.00
Subtotal Operating Costs		65.20	92.06	525.50
1.10	Interest On Oper. (15%)	2.45	3.45	19.71
TOTAL OPERATING COSTS		**$ 67.65**	**$ 95.51**	**$ 545.21**
B.	**FIXED COSTS**			
2.01	Land Costs	$ 25.00	$ 25.00	$ 150.00
2.02	Depreciation	13.60	13.60	81.60
2.03	Investment (10%)	11.40	11.40	68.40
2.04	Pollination Fixed Costs	0.00	48.90	244.50
TOTAL FIXED COSTS		**$ 50.00**	**$ 98.90**	**$ 544.50**
C.	**LABOUR**			
3.01	Alfalfa	$ 16.00	$ 12.00	$ 76.00
3.02	Leafcutters	0.00	14.00	70.00
TOTAL LABOUR COSTS		**$ 16.00**	**$ 26.00**	**$ 146.00**
TOTAL COST OF PRODUCTION		**$133.65**	**$220.41**	**$1,235.71**
Flax Income				$ 107.00
Bee Income				$ 25.00
NET TOTAL COST				**$1,103.71**
Total Yield				1,350 lbs
Breakeven Cost on Total Yield				
	Operating			$0.31/lb
	Total			$0.82/lb

ASSUMPTIONS

Estimated Yield:

It was assumed the following yields would be obtained over the 6 years of production.

	Estimated Yield	
Years	**Kilograms/Hectare**	**Pounds/Acre**
1	0	0
2	280	250
3	395	350
4	335	300
5	280	250
6	225	200
Total	**1,515**	**1,350**
Average	**253**	**225**

Flax Income:

It was estimated by the group that the flax nurse crop would reduce the first year's costs by:

A yield of 750 kg/ha (12 (bu/ac) at a price of $350.00/tonne ($8.90/bu) for a total of **$264.00/ha ($107.00/ac)**.

Bee Income:

Assuming a 1.5 - fold return in bees, for three of the six production years the average income would be as follows:

Bee Income	ha	ac
Saleable Bees	25,000	10,000
Expected price/bee	.005	.005
Expected income	$125.00	$50.00
Assume this is obtained 3 out of 6 years. Therefore income will be 1/2 of the above or -	$ 62.50	$25.00

WORKSHEET

A. OPERATING COSTS

1.01 Seed Costs:

Producers agreed a nurse crop was necessary for weed control. Flax was the recommended nurse crop.

Flax	25 lbs/acre @ $0.21/lb.	=	$ 5.25/ac.
Alfalfa Seed	1 lb./acre @ $4.10/lb.	=	$ 4.10/ac.
TOTAL			$ 9.35/ac.
or			
Flax	28 kg/ha @ $ 0.46/kg.	=	$12.88/ha.
Alfalfa Seed	1.12 kg/ha @ $ 9.05/kg.	=	$10.14/ha.
TOTAL			$23.02/ha.

1.02 Fertilizer Cost:

Fertilizer was applied only in the year of establishment. It was assumed that 55 kg/ha (50 lbs./ac) of 11-52-0 was applied at a cost of **$18.00 per hectare ($7.30 per acre)**.

1.03 Herbicide Costs:

Herbicides to be used in an alfalfa seed field vary according to weed population and weed spectra. The cost of your chemical weed control program may be lower if weed populations do not warrant treatment. Consult the Guide to Chemical Weed Control, published by Manitoba Agriculture, for specific recommendations regarding chemical usage.

COST OF CONSENSUS HERBICIDE/DESICCATION PROGRAM

	Cost/Hectare	Cost/Acre
Perennial weed control the year prior to establishment	$ 15.93	$ 6.45
Seed down year	33.59	13.60
First cropping year	139.04	56.29
Second cropping year	10.77	4.36
Third cropping year	163.74	66.29
Fourth cropping year	89.64	36.29
Fifth cropping year	89.64	36.29
Average of the five cropping years	98.57	39.90

1.04 Insecticide Costs:

Year	Chemical *Dimethoate $/ha	*Dimethoate $/ac	**Dylox $/ha	**Dylox $/ac	Total $/ha	Total $/ac
1	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00
2	22.51	9.02	22.30	$ 8.96	44.81	17.98
3	22.51	9.02	0.00	0.00	22.51	9.02
4	22.51	9.02	22.30	8.96	44.81	17.98
5	22.51	9.02	0.00	0.00	22.51	9.02
6	22.51	9.02	0.00	0.00	22.51	9.02
Total	**$112.55**	**$45.10**	**$44.60**	**$17.92**	**$157.15**	**$63.02**
Average Cost Per Cropping Year					$31.43	$12.60

* Includes ground application of $3.70/hectare ($1.50/acre).
** Includes aerial application cost of $8.65/hectare ($3.50/acre).

1.05 Machinery Operating:

Machinery operating costs consist of fuel plus maintenance and repairs.

	Establishment Year		4 Cropping Years		Final Cropping Year	
Cost	$/ha	$/ac	$/ha	$/ac	$/ha	$/ac
Fuel	$44.45	$18.00	$23.50	$ 9.50	$44.45	$ 18.00
Maintenance & Repairs	21.00	8.50	13.00	5.25	13.00	5.25
TOTAL	$65.45	$26.50	$36.50	$14.75	$57.45	$23.25

Total Cropping	**$203.45/ha**	**$82.25/ac**
Average Cropping	**$ 40.70/ha**	**$16.45/ac**

1.06 Field Inspection:

Assume total acreage at 200 acres (80 hectares):

Basic	$ 15.00
Acreage Fee (200 x $0.95)	190.00
Crop Certificate Fee $5.00	5.00
Branch Fee (200 x $0.16)	32.00

$242.00/200 acres
$242.00/80 hectares

or

$ 1.21/acre/year
$ 3.00/ha/year

1.07 Roguing:

Roguing is the process of physically removing undesirable plants and/or weeds that have escaped the normal weed control program. Producers estimate that **12.35/hectare ($5/acre)** would be the average cost to cover the labor for roguing over the cropping years.

1.08 **Pollination Costs: (Cropping Years)**

The leafcutter bee operation is capable of pollinating 80 hectares (200 acres); the initial bee investment includes 50,000 bees/hectare (20,000 bees per acre) purchased at $0.005 ($0.0042 U.S. exchange of 1.20) per bee.

Operating Costs	Cost/Hectare	Cost/Acre
Hydro	$ 2.60	$ 1.05
Fuel	2.85	1.15
Building Repairs	3.45	1.40
Equipment Repairs	4.70	1.90
Insurance		
Bees	3.35	1.35
Equipment	3.35	1.35
Decontamination	1.75	0.70
Cocoon Testing	1.00	0.40
Miscellaneous	6.40	2.60
Total Operating Costs	**$29.45**	**$11.90**

1.09 **Miscellaneous:**

Overhead expenses, such as telephone, accounting, etc. were estimated at **$5/hectare ($2/acre)** for the establishment year and **$12.35/hectare ($5/acre)** for the producing years.

1.10 **Interest On Operating:**

Interest on operating costs are calculated on the average (1/2) operating cost for a period of six months. In this instance a **15%** interest rate was assumed.

B. **FIXED COSTS:**

2.01 **Land Costs:**

Land values for production of alfalfa seed vary throughout the province. It was assumed for purposes of this study that land for production of alfalfa seed could be rented for **$62/hectare ($25/acre).**

2.02 Depreciation:

Producers assumed that machinery, equipment and storage facilities were the same compliment as a grain farm. It was assumed that machinery and equipment would average **$370/hectare ($150/acre)** and storage would average **$100/hectare ($40/acre).**

To calculate this portion of the fixed costs it was assumed that salvage value was **20%** of the original value. Useful life varied from **10 years** for machinery and equipment to **20 years** for storage facilities.

Machinery & Equipment:	$\frac{370 - 74}{10}$	= **$29.60/ha**		$\frac{150 - 30}{10}$	= **$12.00/ac**
Storage:	$\frac{100 - 20}{20}$	= **$ 4.00/ha**		$\frac{40 - 8}{20}$	= **$ 1.60/ac**
		$33.60/ha			**$13.60/ac**

2.03 Investment Cost:

The opportunity cost interest rate used on machinery, equipment and storage was **10%.**

$\frac{470 + 94}{2}$ x 10% = **$28.20/ha** $\frac{190 + 38}{2}$ x 10% = **$11.40/ac**

2.04 Pollination Costs:

1. <u>Bee Investment</u>:

Bee investment was based on 50,000 bees per hectare (20,000 bees per acre) at $0.005 per bee ($0.0042 U.S. exchange rate of 1.20). Investment rate of **10%** was used.

Therefore cost was calculated as follows:

50,000 x $0.005 x 10% = **$25.00/ha**

20,000 x $0.005 x 10% = **$10.00/ac**

2. <u>Depreciation</u>:

To calculate depreciation for the leafcutter bee enterprise, producers arrived at a consensus of equipment and costs necessary to the enterprise.

Annual depreciation for the leafcutter bee enterprise was calculated to be **$52.99/hectare ($21.20/acre).**

3. **Investment Cost:**

Annual investment cost for machinery and equipment for the leafcutter bee enterprise was estimated to be **$44.26/hectare ($ 17.70/acre).**

Summary	$/ha	$/ac
Bee Investment	$ 25.00	$ 10.00
Depreciation	$ 52.99	$ 21.20
Investment Cost	$ 44.26	$ 17.70
	$122.25	**$ 48.90**

C. **LABOUR COSTS:**

3.01 Alfalfa:

Labour cost was assumed to be valued at **$8/hour**. Producers estimated the following.

	Hrs/Hectare	Hrs/Acre	Rate/Hr.	Total/Hectare	Total/Acre
Establish	5.0	2.0	$8.00	$40.00	$16.00
Cropping	3.7	1.5	$8.00	$29.60	$12.00

3.02 Leafcutter Bees:

In determining the labor costs for the leafcutter bee enterprise the following activities were considered:

1. Spring sitework
2. Installation
3. Summer inspection
4. Winter storage

For this size of enterprise 350 hours or 4.3 hours/hectare (1.75 hours/acre) is sufficient. Therefore, cost per acre was calculated as follows:

4.32 hrs. x $8/hr. = **$34.58/ha**

1.75 hrs. x $8/hr. = **$14.00/ac**

LEAFCUTTER BEE
INVESTMENT SCHEDULE

Item	Initial Cost	Salvage Value	Useful Life	Annual Dep'n. Per Ha	Annual Dep'n. Per Ac	Annual Invest Per Ha	Annual Invest Per Ac
Shelters	$ 6,700	$1,340	10	$ 6.70	$ 2.68	$ 5.03	$ 2.01
Nests	21,440	4,288	10	21.44	8.58	16.08	6.43
Incubation Trays	2,400	480	10	2.40	0.96	1.80	0.72
Cooler & Compressor	3,300	660	10	3.30	1.32	2.48	0.99
Cell Remover	3,400	680	10	3.40	1.36	2.55	1.02
Cell Breaker	1,650	330	10	1.65	0.66	1.24	0.50
Other Equipment	1,700	340	10	1.70	0.68	1.28	0.51
Building	12,000	2,400	20	6.00	2.40	9.00	3.60
Truck & Trailer	6,400	1,280	10	6.40	2.56	4.80	1.92
Bees	20,000			0.00	0.00	25.00	10.00
				$52.99	$21.20	$69.26	$27.70

Assumptions:

Bees - Leafcutter bees are placed out on the alfalfa fields at a rate of 50,000 bees/ha (20,000 bees/ac). Assuming a 33% female ratio in the bee population, there would be approximately 20,000 female bees/shelter.

Shelters - Bee shelters are placed on the fields at a rate of 1 shelter/1.2 ha (1 shelter/3 ac). Standard bee shelters (4'x4'x8' plywood const.) are valued at $100 each. A minimum of 67 shelters are required.

Nests - Polystyrene nesting material was decided upon for use in this operation. The style of next box chosen accomodates 200 polystyrene grooved boards, or 6,000 tunnels per nest. Allowing 1.5 tunnels/female, 5 of these nests will be required per shelter. Recognizing the fact that some breakage of the nest boards will occur (eg. during cell removal), an annual replacement cost equal to 10% of the nests' value was added. A minimum of 335 nests are required at a cost of $64.00 per nest.

Incubation Trays - Incubation trays, each having a 30,000 cocoon capacity, are valued at $15 per tray. A minimum of 134 trays are required (2 trays/shelter for 67 shelters). Also, an additional $400 is included for racks to hold the trays during incubation.

Other Equipment - This includes the costs of heaters, humidifiers, dehumidifiers, black lights (parasite control), fans, an alarm system and a cell tumbler.

$$\text{Annual Depreciation} = \frac{\text{Initial Cost - Salvage Value}}{\text{Useful Life}}$$

$$\text{Annual Investment} = \frac{\text{Initial Cost + Salvage Value}}{2} \times \text{Interest Rate (10\%)}$$

$$\text{Bee Investment} = \text{Initial Cost} \times \text{Interest Rate (10\%)}$$

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FOR FURTHER INFORMATION CONTACT YOUR LOCAL AGRICULTURAL OFFICE.